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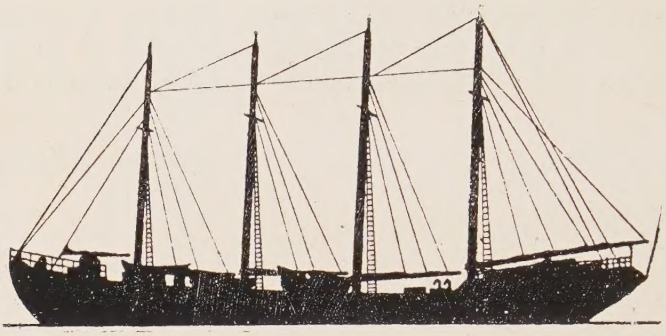

Figure 1. *AVIZ.* Four-masted auxiliary schooner, wooden construction, gross tonnage: 523.05 tons; 400 h.p.; refrigerated. Length: 45.42 m.; moulded draft: 5.06 m.; beam: 10.30 m.; capacity of fish hold: 8,814 quintals.

Constructed in Gafanha, Portugal, 1939.

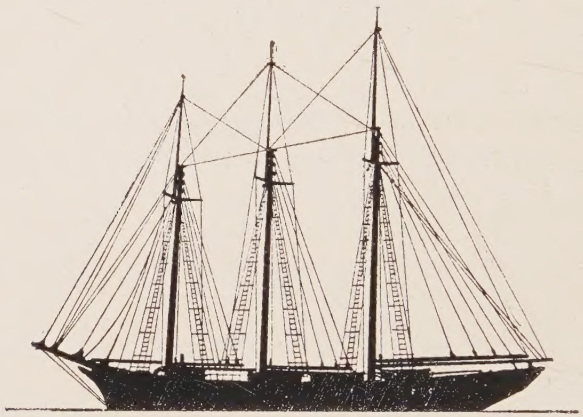

Figure 2. *NAVEGANTE II.* Three-masted auxiliary schooner, wooden construction, gross tonnage: 297.92 tons; 160 h.p. not refrigerated. Length: 39.69 m.; moulded draft: 4.19 m.; beam: 9.29 m.; capacity of fish hold: 6,700 quintals.

Constructed in Fâo, Portugal: reconstructed in 1943.

Figure 3. *SAO GONÇALINHO.* Diesel engine trawler, steel consruction, gross tonnage: 1,215.13 tons; 1,100 h.p.; refrigerated. Length: 71.50 m.; moulded draft: 5.04 m.; beam: 11.00 m.; capacity of fish hold: 20,000 quintals.

Constructed in Viana do Castelo, Portugal, 1948.

Pictures by courtesy of *Grêmio dos Armadores de Navios da Pesca do Bacalhau, Lisbon, Portugal.*

# THE PORTUGUESE COD INDUSTRY CORPORATIVE ORGANIZATION[1]

## *Situation before the Corporative Organization*

Until 1934, the Portuguese cod industry was able to supply only a small part of the effective consumption capacity of the domestic market. In 1931, the total cod catch of the Portuguese fishing fleet amounted to only 5 percent of the total consumption of cod. Low productivity was a result of the use of extremely backward fishing methods and rather old and inefficient craft. In addition, only 21 vessels, amounting to a gross tonnage of 7,096, were in operation ; none of these was motorized, equipped with radio or had insulated fish holds. For these reasons the unit cost of production was high. However, despite this fact, the inferior quality of the domestic product resulted in a market price always lower than that quoted for imported products.

Consequently, many firms were often operating at a loss, and domestic market prices were seriously influenced by the quantities and prices of imports. This situation was aggravated by dumping from supplying countries, and there were no controls on imports or prices to counterbalance it, since the national output contributed so inadequately to the domestic cod consumption needs.

## *Re-organization of the Portuguese Cod Industry on a Corporative Basis*

From 1934 to 1936 the Portuguese Government took steps towards the re-organization of the cod industry on a corporative basis, aimed at the improvement of domestic production and the national distribution of cod products.

The *Commissão Reguladora do Comércio do Bacalhau* (C.R.C.B., Committee for Regulating Trade in Codfish), the *Grémio dos Armazenistas de Mercearia* (G.A.M., Foodstuff Wholesalers' Corporation), and the

[1] This outline emphasizes only the economic aspects of the Portuguese Cod Industry Corporative Organization although some references are made to related fields. It does not intend to give a detailed account of the problems concerning this activity, or to follow the routine legislative steps taken to effect minor legal adjustments within the industry. Readers wishing to study the subject further are referred to the summary of the Government Acts and other official or semi-official material mentioned in the biliography.

*Grémio dos Armadores dos Navios da Pesca do Bacalhau* (G.A.N.P.B., Cod Fishing Boat Owners Corporation), were established by government decree (*see* list pp. 9, 10) to exercise some control over production and domestic and foreign trade in cod.

The C.R.C.B. was set up to protect domestic production against the excessive competition to which it had been subjected from foreign imports. Its main functions are :

(*a*) to stabilize the supply and price of cod products on the domestic market by enforcing allocation of the national product and by establishing controls on imports in accordance with planned quotas for domestic consumption ;
(*b*) to establish quality standards for cod products and to enforce them by careful inspection of the handling in both production and distribution ;
(*c*) to establish standards for types and specifications of craft, gear, etc. in the rebuilding of the national fleet with a view to improving its efficiency ;
(*d*) to assist fishermen with technical advice on the fishing grounds and to give them social security services ;
(*e*) to build refrigerated warehouses to minimize fluctuation in supply through a more rational allocation of imported and nationally produced cod ;
(*f*) to promote the improvement of cod fishing and handling methods.

The C.R.C.B. also acts as a liaison between the Government and the Portuguese Corporative Organization, which represents private industry, on matters related to imports and national production. Its Board of Directors is composed of a President and a Vice-President, appointed by the Government, and three representatives from corporative organizations. The President is under the direct control of the Minister of Economic Affairs.

The C.R.C.B., with headquarters in Lisbon, is divided into two principal divisions : the Central Services Division, covering administrative, technological and economic subjects regarding general policies, and the External Services Division, dealing with local matters of control, inspection and stocks. Local branches, which control the central and refrigerated warehouses and inspection services, are located in principal ports. Representatives of the C.R.C.B. have been established in Newfoundland and Norway.

The aim of the *Grémio dos Armazenistas de Mercearia* (G.A.M.) is to co-operate with the C.R.C.B. in matters of wholesale distribution of cod, in order to stabilize Portuguese market prices through periodic allocation of imports. Its main functions are :

(*a*) to establish quotas for the wholesale distribution of salted cod ;
(*b*) to import on behalf of individual members in accordance with established quotas and special credit arrangements ;

(*c*) to sell to members ;
(*d*) to collaborate with other corporative organizations in the enforcement of controls and the improvement of the domestic cod salted industry. The G.A.M. is responsible to the Minister of Economic Affairs in matters of economic policy, inspection and general advice.

The *Grémio dos Armadores dos Navions da Pesca do Bacalhau* (G.A.N.P.B.), which incorporates all shipowners operating cod fishing craft and which is responsible to the Minister of the Navy, aims principally at the technical improvement of the cod fishing fleet. It also has the power to inspect and improve fish processing. So far, its principal functions have been :

(*a*) to advise and assist shipowners in introducing technological improvements in the fishing fleet ;
(*b*) to assist in the professional training of fishermen and in the establishing of professional categories ;
(*c*) to provide credit facilities for its members according to established plans for shipbuilding and needs for improvement of gear, etc ;
(*d*) to establish special rules for the insurance of craft, gear and equipment, with the participation of private insurance companies or through the G.A.N.P.B.'s own corporative insurance organization ;
(*e*) to establish a co-operative organization to supply all operational needs to the cod fishing fleet.

## Plans for Technical Improvements

The economic control of the cod industry could be implemented only through a plan embracing all activities of the industry. A complete and specialized organization to deal with the problem from its many angles was deemed necessary : the three organizations outlined above were entrusted with this work. It was also felt that no system of economic control would be effective unless combined with an effort to solve some of the most urgent technological problems in production and distribution.

In the field of production, the plan was to increase the efficiency of the fishing fleet and the total catching capacity. This had two domestic implications :

(*a*) to attain the quota established by the Government for domestic production of cod which is about 60 percent of the national consumption ;
(*b*) to reduce the unit cost of production of domestic output to a level competitive with market prices for the foreign product.

This has been partially fulfilled in two periods — the first from 1934 to 1938 and the second from 1938 to date.

At first, the principal aim was to increase the total catching capacity by augmenting the number and tonnage of the fishing craft. In 1935, a special fund was instituted for the reconstruction of the cod fishing fleet. In 1936, it was decided that its resources should come from periodical contributions to be made by the members of the G.A.N.P.B., proportionate to the value of fish sold by them. Each boat had a special account and the balance of the account could be invested only in technical improvements in craft and gear. A premium was fixed in 1939 for all shipowners who had built new craft; the G.A.N.P.B. also gave special credit facilities to shipowners for craft improvement. This credit amounted to about 46,000 contos during 1936-1942. The resulting increase in the number and tonnage of craft can be seen in Table 1.

TABLE 1 — PORTUGAL: NUMBER, TONNAGE AND DESCRIPTION OF CRAFT OPERATING IN YEARS 1930-1938

| Year | No. of Ships (metric tons) | Gross Tonnage | No. of Motor-Ships | No. of Ships With Radio | No. of Ships With Refrigerated Storerooms |
|---|---|---|---|---|---|
| 1930 | 43 | 11 362 | — | — | — |
| 1931 | 21 | 7 096 | — | — | — |
| 1932 | 24 | 8 064 | 2 | — | — |
| 1933 | 35 | 9 672 | 7 | — | — |
| 1934 | 34 | 9 165 | 8 | — | — |
| 1935 | 47 | 13 938 | 22 | — | — |
| 1936 | 50 | 15 483 | 28 | — | — |
| 1937 | 49 | 17 145 | 35 | 16 | 2 |
| 1938 | 51 | 17 393 | 38 | 38 | 13 |

*Source*: *Boletim dos Organismos Corporativos e de Coordenacão Económica do Comércio e da Indústria*, Vol. 1, April 1939, Lisbon, Portugal.
Official report by the Ministério do Comércio e Indústria, *Diario de Noticias*, 8 January 1939.

However, in 1938, the total catching capacity of the cod fishing fleet amounted only to about 25 percent of the total national consumption, this being much lower than the planned official target. A new policy was therefore initiated in 1939, aiming at the renewal of the cod fishing fleet through the improvement of the old craft and by the building of new units. It was backed by substantial government financial assistance. A large private corporation, the "Sociedade Nacional dos Armadores de Bacalhau," was created to pool the financial resources of the ship-owning members of the G.A.N.P.B. This corporation was to build new craft for the cod fishing fleet. An amount of 7,700 contos was invested in the initial capital of the corporation, through a special fund built up by the C.R.C.B. on a compensatory basis, re-

sulting from differences in the quoted market prices for the domestic and foreign product. The Government granted considerable credit facilities to all shipowners planning to build new craft.

The results of this second phase of the plan for rebuilding the national cod fishing fleet are shown in Tables 2, 3 and 4, noting that :

(i) the increase in the efficiency of the craft can be roughly measured by the rising rate of national output/number of craft since 1939 (Table 2) ;

(ii) the rise in the national effective catching capacity can be appreciated by the increasing rate of national output/gross supply since 1939 (Table 3) ;

(iii) the decrease in the rate of unit value of national output/unit value of imports is also a rough index to measure the quick adjustment of the national price level to the level of competitive prices quoted for the foreign product (Table 4).

In the field of distribution, the principal target was to stabilize market prices of cod products and to improve commercial standards of the domestic output. The stabilization of prices could be maintained only through a system of cold storage facilities to control seasonal

TABLE 2 — PORTUGAL : COD FISHING CRAFT ; LANDINGS OF WET-SALTED COD AND AVERAGE LANDINGS OF COD PER CRAFT (SCHOONERS AND TRAWLERS), 1939-1949

| Year | Craft | | Landings[1] | Average Landings[1] per Craft |
|---|---|---|---|---|
| | Schooners | Trawlers | | |
| | (....*Number*....) | (*Gross Tonnage*.) | (.....*Metric tons*.....) | |
| 1939-40[2] | 49 | 19 667 | 19 325 | 394 |
| 1940-41[2] | 47 | 19 433 | 20 541 | 437 |
| 1941-42[2] | 48 | 20 904 | 20 702 | 431 |
| 1942 | 47 | 21 502 | 21 014 | 447 |
| 1943 | 48 | 23 541 | 22 803 | 475 |
| 1944 | 48 | 25 637 | 24 679 | 514 |
| 1945 | 54 | 31 621 | 28 849 | 534 |
| 1946 | 62 | 39 022 | 31 670 | 511 |
| 1947 | 62 | 40 322 | 34 489 | 556 |
| 1948 | 67 | 47 699 | 36 163 | 540 |
| 1949 | 78 | 64 182 | 45 333 | 581 |

*Source* : *Revista do Centro de Estudios Económicos*, No. 5, 1947, p. 93. Instituto Nacional de Estatística, Lisbon. Portugal.
*Estatística Industrial*, Instituto Nacional de Estatística, Lisbon, Portugal.

[1] Wet-salted basis.
[2] 1 June to 30 July.

TABLE 3 — PORTUGAL : LANDINGS[1], IMPORTS AND ESTIMATED GROSS SUPPLY OF COD PRODUCTS, 1939-1949

| Year | Landings[1] | Imports of Dried and Salted Cod | Estimated Gross Supply[2] | Percentage of Landings over Estimated Gross Supply |
|---|---|---|---|---|
| | (..... Metric tons .....) | | | |
| 1939 | 12 755 | 38 316 | 51 071 | 25 |
| 1940 | 13 557 | 27 578 | 41 135 | 33 |
| 1941 | 13 663 | 16 963 | 30 626 | 45 |
| 1942 | 13 869 | 23 581 | 37 450 | 37 |
| 1943 | 15 050 | 13 287 | 28 337 | 53 |
| 1944 | 16 288 | 12 333 | 28 621 | 57 |
| 1945 | 19 040 | 9 238 | 28 278 | 67 |
| 1946 | 20 902 | 17 278 | 38 180 | 55 |
| 1947 | 22 763 | 27 625 | 50 388 | 45 |
| 1948 | 23 868 | 26 541 | 50 409 | 47 |
| 1949 | 29 920 | 27 624 | 57 544 | 52 |

*Source:* *Revista de Centro de Estudios Económicos* (No. 5, 1947, p. 94), Instituto Nacional de Estatística, Lisbon, Portugal.
*Estatística Industrial*, Instituto Nacional de Estatística, Lisbon, Portugal.
*Yearbook of Fisheries Statistics*, 1947, F.A.O, Washington, D. C., 1948.
*Comércio Externo*, Vol. 1, Instituto Nacional de Estatística, Lisbon, Portugal. Official communications.
[1] Quantities reported as wet-salted have been converted to dried basis.
[2] Excludes exports and changes in stocks.

and other fluctuations in the domestic and foreign supply. Since 1934, the C.R.C.B. has built, in convenient centers, a very complete system of warehouses, most of them fitted with refrigeration systems.

At present, the C.R.C.B. owns four refrigerated warehouses and one non-refrigerated one ; the total capacity of storage for all of them is 18,766 tons which represents nearly 40 percent of the total supply in 1948. A plan for expanding the cold storage facilities calls for more plants.

TABLE 4 — PORTUGAL : AVERAGE UNIT VALUES OF LANDINGS AND THE IMPORTS OF COD

| Year | Value of Landings per Metric Ton[1] (*Escudos*) | Value of Imports per Metric Ton[2] (*Escudos*) | Index Numbers: Unit Values for Landings Unit[1] Value for Imports[3] 1939 = 100 |
|---|---|---|---|
| 1939 | 2 201 | 2 344 | 100 |
| 1940 | 2 262 | 3 285 | 73 |
| 1941 | 3 925 | 4 778 | 87 |
| 1942 | 4 481 | 6 437 | 74 |
| 1943 | 5 000 | 7 789 | 69 |
| 1944 | 5 500 | 8 900 | 66 |
| 1945 | 5 485 | 8 897 | 66 |
| 1946 | 5 491 | 9 968 | ... |
| 1947 | 5 487 | 10 601 | 55 |
| 1948 | 5 989 | 10 163 | 63 |
| 1949 | 5 975 | 9 317 | 68 |

*Source* : *Revista do Centro de Estudos Económicos*, Lisbon, Portugal, Instituto Nacional de Estatística. No. 5, 1947, p. 94.
*Estatística Industrial*. Instituto Nacional de Estatística, Lisbon, Portugal.
*Yearbook of Fisheries Statistics*, 1947, F.A.O., Washington, D.C., U.S.A., 1948.
*Comércio Externo*, Vol. 1, Instituto Nacional de Estatística, Lisbon, Portugal.
[1] Wet-salted cod.
[2] Dried and salted cod.
[3] These index numbers intend to express only the general trend in the adjustment of the national price level to that of foreign competitive prices. That rate, not considered as a term of a time series, has no special meaning as regards the unit value of distinct commodity products : the national slightly salted cod (wet-salted) or the foreign salted and dried cod.

## *Allocation System and the Control of Prices*

The three corporative organizations — the C.R.C.B., G.A.N.P.B., and G.A.M. — also carry out price control and market allocations of both domestic and foreign cod products in the following manner :

(1) C.R.C.B. periodically computes the potential market demand for the dried cod product throughout the country; on the basis of these estimates and on estimates of national landings and the volume of existing stocks, the C.R.C.B. plans import quotas for dried and salted cod. The official policy allows for imports of about 40 percent of the total effective consumption. Although the domestic output could be expanded to the 100 percent level of self-sufficiency, the Government has not enforced such an increase in order to provide for the 40 percent import quota in bilateral agreements with other countries in exchange for the placement of Portuguese exports.

(2) C.R.C.B. fixes the amount of cod to be imported during each fishing season from each source of foreign supply, taking into account the availability of resources and the price quotations for the national and the foreign product. The G.A.M. then maintains firm control over imports and retail prices on the basis of policies drafted by the C.R.C.B.

(3) Imported cod is stored immediately in refrigerated warehouses owned by the C.R.C.B. During and after unloading, the product is inspected by the experts of the C.R.C.B., classified according to Portuguese standards, packed in sacks of 60 kilograms net weight (Portuguese quintal) and stored in the C.R.C.B. warehouses.

(4) The domestic product is inspected after landing to check conditions of preservation and processing onboard ; it is then stored in the C.R.C.B.'s warehouses. Depending on the availability of space at the curing and drying stations and the priority established through inspection, the cod passes from the warehouses to the washing, curing and drying stations. After the curing operation, it is classified again by the C.R.C.B. experts. It is then packed in sacks of 60 kilograms net weight and stored in the C.R.C.B.'s warehouses.

(5) The final phase of the allocation system is much the same for national and imported products. The C.R.C.B. and the G.A.M. are the exclusive sellers of cod products on the wholesale market and fix quotas and minimum prices. This operation is carried on normally through auction sales in the Lisbon and Oporto markets. The products are

bought by the wholesale importers of those cities in accordance with the needs of the retail trade or the rates enforced by the allocation system. When domestic production or imports are not completely allocated through auction sales, the wholesale importers are compelled to take the excess product at its minimum price on a system of proportionate allocation according to the amount of foreign product previously imported by each one. This system applies also in periods of abnormal scarcity. It must be pointed out that G.A.M. is always the agent responsible for trade in foreign products — either buying on foreign markets or distributing them on national markets.

(6) After the wholesale auction sales, the cod goes to the retail trade through a system of periodic allocations made by responsible organizations such as the C.R.C.B., or G.A.M. Until allocated, it stays in C.R.C.B. warehouses at the order of its wholesale owner. The wholesaler importers in Lisbon and Oporto are responsible for the allocation of the cod product to the retailers of those cities as well as to the wholesalers in other sections of the country.

(7) To stabilize internal market prices, the Government instituted a compensation fund whose balance reverts to the national shipowners as financial assistance for rebuilding the cod fishing fleet. The receipts of the fund were built up by means of a levy on imported fish ; payment was made by the wholesale importers as members of G.A.M. In recent years, this levy has been applied conversely. A levy on fish produced domestically was paid to reduce the unit cost of imported fish in the consumption market ; this meant the maintenance of the same price level for the domestic and foreign product. It must be pointed out that this levy has been enforced continuously since it was established in 1936 and has been used always as a compensation tax for the stabilization of internal prices. The policy followed in the application of the fund balance shows that the changing national and international economic conditions were always duly considered within the aims set for the improvement of the national industry. For instance, in 1949, as the rising costs for the national product endangered the economic position of the industry, the levy was reduced to half its value compared with previous years, the balance being paid to domestic cod producers to compensate for the increased costs of production.

J. Alarcao.

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*Note* : The above-quoted legislation covers only the general lines of policy and organization laid down for the cod industry by Government Acts.

# ESTIMATES OF WORLD CATCHES BY SPECIES GROUPS AND BY UTILIZATION

The total annual output of world fisheries is not known in accurate terms, but an FAO estimate places it at about 25 million metric tons for 1949. In the FAO *Yearbook of Fisheries Statistics* 1948-49[1] this total is broken down by continents and countries. The continental breakdown is as follows :

| Continent | Metric Tons | Percent |
|---|---|---|
| Africa | 600 000 | 2 |
| America, North and Central | 3 750 000 | 15 |
| America, South | 500 000 | 2 |
| Asia (excluding U.S.S.R.) | 12 000 000 | 48 |
| Europe (excluding U.S.S.R.) | 6 000 000 | 24 |
| Oceania | 150 000 | 1 |
| U.S.S.R. | 2 000 000 | 8 |
| **World Total** | **25 000 000** | **100** |

These figures are in many cases derived from very rough estimates ; in the case of China, for example, total production in fish ponds was arrived at by relating an estimated minimum average yield per square kilometer to the total known area of fish ponds ; in other cases, a conservative estimate of per caput consumption was made in relation to total popolation figures. As a whole, it is felt that estimates for Asia are less reliable than those for the other continents, but over all, they are considered to be fairly close to reality. It is very unlikely, therefore, that the actual world total exceeds 30 million metric tons, even if all subsistance fishing is taken into account.

The ten most important fish producing countries of the world were in order of importance in terms of catch[2] in million metric tons : Japan (2.9), China (2.7), U.S.A. (2.5), U.S.S.R. (2.0), Norway (1.1), United Kingdom (1.1), Canada (0.9), Spain (0.6), India (0.5), Germany (Federal Republic) (0.5). These countries with a catch of about 15 million tons account for some 60 percent of the world's total.

As far as is known, nothing has been published on a worldwide basis regarding the *relative importance of the various species* caught. The following table, indicating roughly the composition of the catch by some species groups as estimated by the FAO secretariat may therefore serve as a guide :

[1] *Yearbook of Fisheries Statistics* 1948-49, Table 1, p. 3.
[2] Mainly based on 1949 figures.

| Catch by Species Groups | Metric Tons | Percent |
|---|---|---|
| Herring and similar species | 5 200 000 | 21 |
| Cod, hake, and similar species | 3 400 000 | 14 |
| Salmon and similar species | 500 000 | 2 |
| Fresh and brackish water teleosteans | 4 700 000 | 19 |
| Tunas, true mackerels, etc. | 1 400 000 | 6 |
| Teleosteans flat-fishes | 600 000 | 2 |
| Elasmobranchs | 400 000 | 1 |
| Other fish species[1] | 6 400 000 | 25 |
| Crustaceans and mollusks | 2 000 000 | 8 |
| Other (seaweed, etc.) | 400 000 | 2 |
| **World Total** | **25 000 000** | **100** |

There is of course a clear relation between capital equipment and efficiency of fishermen. The world total catch divided between 4 million fishermen leaves only about 6 tons per man. In a modern tuna clipper or trawler, or large seine boat, each man produces more, while those in an dugout canoe or without craft at all, produce well below the average. Thus, great differences in economic planning, financial remuneration and standard of living exist among people earning their living from the sea.

If the total world catch of 25 million metric tons were divided evenly between the total world population (2,350,000,000) the result would be about 10.6 kg. per head annually, but this figure does not realistically indicate how much fish is actually consumed, because a considerable part of the total weight is "lost" during cleaning and dressing, and a significant quantity is converted into oil and meal, not for direct human consumption as food.

The following table indicates how the gross world fish catch is used. The figures are estimated to a great extent:

| Manner Used | Metric Tons | Percent |
|---|---|---|
| Marketing as fresh | 10 370 000 | 42 |
| Freezing | 1 070 000 | 4 |
| Drying, smoking, salting, pastes and sauces | 9 820 000 | 39 |
| Canning | 1 290 000 | 5 |
| Reduction to oils and meal | 1 950 000 | 8 |
| Other purposes | 500 000 | 2 |
| **World Total** | **25 000 000** | **100** |

[1] May include some quantities of the listed species groups.

On examining the external *trade statistics* of nearly 70 territories, accounting for almost all international trade in fisheries products, ti was found that some 2 million tons of fish and fisheries products (product weight) enter into international trade (not accounting for whale and other aquatic mammal products). About 10 percent is accounted for by canned products, 25 percent by fresh and frozen products, 25 percent salted, dried, smoked and otherwise cured, 20 percent fish oils. 10 percent meals, and 10 percent by miscellaneous products. If the weight of these products is converted roughly to the weight of the weight of the round fresh fish used to manufacture them, it is found that they were derived from some 5 million tons or possibly more. It can safely be stated, therefore, that some 20-30 percent of the world's fish catch passes through international trade channels.

G.M.G.

## THE FISH CULTURE RESEARCH AND TRAINING INSTITUTE AT PENANG, MALAYA[1]

The postwar shortage of food has focused attention on the possibilities of fish farming as a means of supplementing the protein diet of the peoples in the British Commonwealth. This is especially true of certain colonies where the natural fisheries are poor and are unable to meet the requirements of the local population, or where the populations are located far from the coast.

Fish farming as an adjunct to peasant agriculture has long been traditional in certain countries in the Far East, notably China, Japan and Java. The techniques of fish culture in ponds have reached their highest stage of development in these countries. These traditional techniques, although built upon centuries of experience, are empirical.

There is a need for a fundamental research center for fish farming to analyze, on a scientific basis, the methods developed by practical fish farmers during their experience of centuries, with the objective of improving methods by the scientific knowledge acquired, as has been done in agriculture. This fundamental center should be established in the Far East where fish farming is most advanced.

A scheme was formulated in 1950 for the establishment of a Fish Culture Research and Training Institute. After considering many sites not only in Malaya but in Hongkong, Borneo, Sarawak and even in East Africa, the nearest approach to the ideal was found at Sungei Pinang Kechil on the west coast of Penang Island, about 20 miles (32 km.) from Georgetown. This site offers several advantages, among

[1] Information transcribed from letter and document provided by D. W. le Mare, Director of Fisheries Malaya, Penang, Malay States, on 29 September 1951.

which is that of being on an island, thus minimizing the risk of introduction of exotic species of fish.

An area of 242 acres (98 ha.) has been considered for building a laboratory, senior and junior officers' quarters and resthouse for visiting research workers, and for fish ponds. Expert fish farmers, Chinese and Javanese, will assist in the laying out of fish ponds. These will consist initially of the following :

| | |
|---|---|
| Javanese fish ponds ..... | 11 acres ( 4 5 ha ) |
| Chinese fish ponds ..... | 14 acres ( 5 7 ha ) |
| Experimental ponds ..... | 24 acres ( 9 7 ha.) |
| Latin square ..... | 36 acres (14 6 ha.) |
| Fry and spawning ponds. ..... | 11 acres ( 4 5 ha ) |
| | 96 acres (38.9 ha.) |

In addition, 60 acres (24.3 ha.) of existing paddy land will be left undisturbed to be used for experiments on the rearing of fish in paddy fields. The salt-water ponds will be laid out in the existing mangrove swamp.

The main building of the Institute will be a two-story building, with office, library, lecture theater, tank room, common room, museum, stores, workshops and dark room. Laboratory rooms will be provided for a director, seven research workers, and two for visiting scientists. In addition, there will be two general laboratory rooms for biochemical and physiological studies.

It is proposed that the senior staff should consist of a director : C.B. Taylor of the United Kingdom has been appointed ; two zoologists, one specializing in parasites and fish diseases ; a botanist ; a physiologist, specializing in sex-physiology and induced breeding of fish which do not at present breed in captivity ; a statistician, to study crop yields under different treatments ; a geneticist, to study heredity ; and a biochemist, to study the rate of conversion of food stuffs and fertilizers into fish protein.

Besides fundamental research into the principles governing fish production in ponds, the Institute will also serve to train officers from other territories, such as Africa and the West Indies, in the techniques studied and developed. After further adaptation, these techniques are expected to suit local conditions of the different territories.

The Institute will be administered by the Government of the Federation of Malaya and Singapore, and will work in close liaison with the Fisheries Department of Malaya. The cost of capital works and annual expenditure for five years will be borne by the British Treasury from Colonial Development and Welfare Research Funds. At the end of the first five years, the annual expenditure will be subscribed by all the Colonial territories and probably some of the Dominions. Countries outside the Commonwealth have shown interest in the scheme and may wish to take part in the training scheme for fish culturists.

Building has not yet commenced, but architects' plans and those for the construction of ponds and sluices are completed. Capital expenditure to the amount of £ 252,000 (U.S.$ 705,600) has been approved by the British Treasury under the Colonial Development and Welfare Scheme.

## RECENT GOVERNMENT CONTRIBUTIONS TO THE DEVELOPMENT OF THE FISHING INDUSTRY OF SÃO PAULO, BRAZIL [1]

São Paulo, the most highly industrialized state of Brazil, does not yet have a fisheries industry to help cope with the food requirements of its population of almost 8 million. The State offers great possibilities for increasing fish consumption, especially in its capital city with a population of nearly 2 million. In spite of continual industrial developments and the large number of food processing industries in operation, the fisheries industry, which mainly provides fresh fish, is still under-developed, and the processing and canning of seafood is at its very beginning. Private attempts at developing the industry have been hampered to a great extent by the lack of facilities to handle, preserve and distribute the commercial catch to consumers. Government assistance is required for the organization of the industry and for the construction of fish markets, cold storage facilities and fish terminals.

The principal port of the state is Santos, located 30 miles (50 km.) from the city of São Paulo, the main fish consuming center. Although Santos is the second fishing port of Brazil, it has been handicapped by the non-existence of premises for a fish market and terminal for the handling and distribution of the commercial catch. While São Paulo has to import fish from Rio de Janeiro and neighboring states, the fishing fleet of Santos is operating on only half of its capacity during the hot season because of lack of ice and cold storage facilities.

A program for the construction of fish terminals and markets in the production and consumer centers, for the inspection and refrigeration, storage and sale of fish, as well as for the furnishing of ice and fuel to the fishermen, was started in 1934 by the Federal Government of Brazil. The first terminal and market were constructed in Rio de Janiero, D.F., the main fishing port of the country, and have helped greatly to increase the fish production there. Rio's fish production is now over 2,000 tons a month.

In continuation of this program, the Brazilian Government, in cooperation with the Government of São Paulo, began the construction of a modern fish terminal and market in Santos in early 1951. Cold storage facilities for 500 tons of fish, an ice factory, a large receiving room to prepare the fish for shipment to the different

[1] Information supplied by Dr. J. A. de Morais, Director of the Institute of Marine Fisheries, Santos, São Paulo, Brazil.

consumer centers of the state, facilities for inspection and collection of statistics, supply of water and fuel, an equipment shop for fishermen and a wholesale market are being built.

The modernization of the fishing boats and gear in São Paulo started about 1910. Canoes, hand-lines and beach seines were replaced by motor boats, circular nets, drag nets and gill nets introduced by European and Japanese fishermen. The new types of boats and gear used increased fish production, and some boat owners saw possibilities for further expansion and imported trawlers with capacities of 50 tons with engines of 400 or more horsepower. The lack of handling facilities handicapped the use of these boats. Although the same difficulties persisted, the industry continued to grow and mechanization proceeded. Today, there are 150 mechanized boats registered with engines varying from 30 to 240 horsepower. There are about 1,500 registered fishermen working with motor boats ; but there are still 3,000 or more fishing with canoes. Fishing operations are still of the beach and coastal types, carried on mostly by small tonnage boats trawling in pairs within twelve miles (20 km.) of the coast. To develop the industry further, the fleet must be expanded with boats large enough to operate in deep sea fishing banks.

The Government of São Paulo recently acquired a new 18.5 meter (60.7 ft.) vessel from Germany to be used for training fishermen, experimenting with new types of fishing gear, exploration of new fishing banks in deep sea waters, and biological investigations.

The State of São Paulo has been taking care of the education of the fishermen's children since 1928. Today, the Institute of Marine Fisheries, under the Division of Fish and Game, gives academic and practical training in navigation, fishing methods, operation and maintenance of fishing craft and gear, boat construction, rudiments of fish processing and related subjects. There is also a small fisheries biology laboratory and a small museum of fishing equipment, marine biology, and products of the sea. The laboratory, museum, and school premises are now being enlarged and, in future, the laboratory will carry on the collection of statistical data and studies of fisheries technology as well as further studies in biology. Arrangements are being made to install also a radio telephone station for communication between land and fishing boats.

H. Rosa, Jr.

## NORWEGIAN HERRING OIL AND MEAL INDUSTRY RESEARCH INSTITUTE [1]

The Norwegian Herring Oil and Meal Industry Research Institute, Damsgård, Bergen, Norway, was founded in July 1948, through the joint efforts of the Norwegian Herring Oil and Meal Manufacturers' Association and the Herring Fishermen's Sales Organizations. It is

[1] Condensed from a note by T. Sparre, Managing Director, Norwegian Herring Oil and Meal Industry Research Institute.

governed by a board consisting of representatives of both organizations and the Managing Director, T. Sparre. The staff consists of about 20 persons, five of whom are fully qualified scientists or engineers. During the period 1 July 1949-30 June 1951, the Institute's physical facilities were expanded considerably; three new laboratories and a chicken house capable of holding 1,800 chicks were installed. A pilot plant was erected near Bergen, and started operation at the end of the 1951 winter herring season. The Institute's research work described in its recently issued third annual report included studies on the utilization of stickwater, its concentration to fish solubles or incorporation into herring meal to form the so-called whole meal. Further experiments were carried out on methods of cooking herring, on storing conditions, and on the effect of various preserving compounds on the raw material. New methods for oil and meal manufacturing have been studied. The effect of storing on herring oil, especially its tendency to develop free fatty acids, was also studied, along with a number of smaller problems. Chick feeding tests were also made. The Institute publishes results of its research in a series entitled, *Meldinger fra S.S.F.* (Reports from the Herring Oil and Meal Industry Research Institute).

## BIBLIOGRAPHIA OCEANOGRAPHICA [1]

The International Commission for the Scientific Exploration of the Mediterranean Sea was given, by international mandate, the task of compiling a bibliography of all the contributions made in the world to the study of the sea and related fields. The *Bibliographia Oceanographica* is an attempt at doing this. It is published annually and contains references to papers published in periodicals issued during the preceding year and dealing with navigation, physical and biological oceanography, and fisheries. First published in 1928 under the title *Essai d'une bibliographie générale des sciences de la mer*, it has been published since 1929 as *Bibliographia Oceanographica*. The publication was interrupted during World War II, but by the courtesy of the National Research Council of Italy (Consiglio Nazionale delle Ricerche) it is now being published as a supplement to the periodical *Ricerca Scientifica* under the responsibility of the Italian Delegation to the International Commission for the Scientific Exploration of the Mediterranean. As soon as possible the *Bibliographia* will be issued separately.

At present the contents are behind a few years and the last issue available, Volume 19 (*see FAO Fisheries Bulletin*, Vol. 4, No. 3, p. 44), published in 1950, contained references of studies published in 1946. Volume 17 was never published and only one facsimile of Volume 18 has been published to date. It is planned to have the subjects

[1] Information supplied by I. Morandini, Editor, *Bibliographia Oceanographica*, on 5 November 1951.

classified according to the Universal Decimal Classification system and to add abstracts in English to supplement the present ones, many of which are in Italian only.

Before the war a limited number of a special issue called *Bibliographia Maris Mediterranei Extracta de Bibliographia Oceanographica* was published yearly for countries interested in the study of the Mediterranean Sea.

The cost of all the volumes available is Lire 26,000 ; Volume 19 costs Lire 1,500.

All communications and enquiries should be addressed to *Bibliographia Oceanographica*, Piazzale delle Scienze 7, Rome, Italy.

H. R., Jr.

# Conferences and Meetings

## FAO Conference

The Sixth Session of the FAO Conference met in Rome, from 19 November to 7 December 1951. The work of the Organization was reviewed and recommendations made for its continuance.

A special panel of fisheries experts attending the Conference was formed to discuss the work of the Fisheries Division. Mohamed K. el Saby, Director of Fisheries of Egypt, acted as chairman while the other officers were : Vice-Chairman — John Lacy, Assistant Secretary, Ministry of Agriculture and Fisheries, United Kingdom ; and Rapporteur — D. V. Villadolid, Director of Fisheries of the Philippines. Daniel Vidart of Uruguay served as Rapporteur for the discussions on the Latin American Fisheries Council.

The Conference found the Fisheries Program to be well balanced in its component parts and generally satisfactory. It found that the program for 1952/53 followed the recommendations of FAO's Working Party on the Program of Work and Long Term Problems, especially in that priority was being given to those projects which would result in a fairly rapid increase in fish production and improvement in utilization, thereby helping to alleviate the world food shortage. The Conference emphasized the importance of taking advantage of the fact that fisheries were able to make a contribution of quickly available animal proteins. It recognized that, considering the role of the fishing industry in the general task of meeting world food requirements, the program needed to be intensified in various sections and that at the earliest opportunity more funds should be available for this program.

World fish production today was estimated at approximately 25 million metric tons and experts were satisfied that the fisheries re-

sources were such that this figure could be doubled without risk to their future ; a production and distribution of 50 million metric tons approached the level which nutritionists indicated to be desirable. The Organization's activities in promoting the appraisal of fisheries resources, their scientific investigation and the formulation of programs for rational exploitation could materially contribute towards the development which was required. The activities in co-ordination and dissemination of information were an integral part of this program and the regional councils would be able to play an effective part in this work. The progress of the Indo-Pacific Fisheries Council (IPFC) warranted optimism in this regard.

The Conference noted the recommendations made at its Third Session that FAO should take action to initiate the formation of regional fisheries councils in parts of the world not now actively serviced by similar bodies and the recommendation of the Second Latin American Regional Meeting on Food and Agricultural Programs and Outlook held in Montevideo, Uruguay, December 1950, that the Director General take steps towards the establishment of such a council in the Latin American region. Approval was given to the substantive provisions of a draft agreement for the establishment of a Latin American Fisheries Council formulated in Lima, Peru, on 22 September 1951 by Member Governments of FAO concerned with the fisheries of Latin America. The Conference recommended that this draft agreement be given favorable consideration by all interested Member Governments of FAO. The Council will come into being as soon as five Member Governments have ratified the agreement.

The program of development would obviously call for substantial changes in the methods of catching and handling fish throughout the world, more especially in the under-developed areas. The Organization's activities in connection with improvement in the design of fishing craft would be important in this regard. There was also need for increased attention to the problem of fishing gear and it was desirable that this section of the program should be strengthened. In the phase of primary production, attention was drawn to the importance of fish culture which offered obvious possibilities of a very considerable increase in production in many parts of the world where marine resources were not readily available. It was a familiar situation that at times there was considerable spoilage and wastage of fish and much improvement could be effected in distribution arrangements. The Organization's work for promoting improvements in marketing and processing technology was, therefore, of the greatest importance.

The Conference considered the work on the digest of present laws and regulations on commodity standards for fisheries products and recommended that this digest should be kept up-to-date, published, and given the widest possible distribution.

In the general program of promoting fisheries development, it was obviously important that the fullest possible range of statistical data should be available, and the Conference recommended that the Organization continue its efforts in the collection of information and

the development of improved quality and comparability in these statistics. The proposal for special statistical meetings should make a valuable contribution in this respect. The Conference was impressed by the importance of seeking the greatest simplicity in the methods suggested for the collection of fisheries statistics and thier presentation. In this connection it noted with approval that regional differences were recognized and that the problems were being attacked on this basis. The Conference also recommended that the Organization endeavor to increase the frequency of issue of its stat stical compilations. It suggested that attempts be made to develop fisheries production statistics in a form that would be useful to the important programs of biological research. Finally, the Conference, in recognizing the importance of fish production in total world food balances, recommended that every opportunity be taken to ensure that the contribution of the fishing industry was taken into account in reviews of the food situation.

The Conference believed that the Organization was assisting the general development program by its activities in disseminating technical information. It approved the publication program in fisheries and recommended that every effort should be made to secure the widest possible distribution. Whilst the Conference recognized the great value of *World Fisheries Abstracts* to fishery workers, it considered that the effectiveness of this publication was seriously limited by the present distribution methods and hoped that means might be devised to make it more readily available.

The Conference noted with satisfaction that the ordinary program and ETAP complemented one another, and this had led to achievements that otherwise would not have been possible. It was impressed by the array of projects of this kind which had been initiated or were under consideration in connection with the fisheries of the world and recommended that this program be prosecuted with vigor. The Conference hoped that Member Governments would assist in every way possible to make fisheries experts available for ETAP projects.

The Conference again drew attention to the need for guiding underdeveloped countries in the direction of developing local fisheries for improved nutrition of local populations rather than for export.

The Conference considered that the Fisheries Program should be intensified in certain specific directions, particularly in respect of gear technology, processing of fish, fish culture and marketing development. The Conference recommended that additional funds for such projects be made available.

## *Gulf and Caribbean Fisheries Institute*

A very informative meeting attended by over 100 fisheries specialists and representatives was held at Miami Beach, Florida, U.S.A., from November 12 to 16, 1951. It was the Fourth Annual Session of the Gulf and Caribbean Fisheries Institute attended by the represent-

atives of the commercial fisheries industry, the Caribbean governments and the south-eastern states of the U.S.A., the U.S. Fish and Wildlife Service, the Atlantic States Marine Fisheries Commission, the National Fisheries Institute, the Food and Agriculture Organization of the United Nations, and other conservation agencies, institutions, universities and government departments.

During the five days' session, 38 papers on fisheries economics, shell fisheries, commercial fisheries, fisheries exploration and technology, new fisheries developments in the Gulf and Caribbean countries and on general subjects were read and discussed. Whilst the meeting was devoted mainly to the discussion of marine fisheries, the paper on the fish culture project in Haiti, presented by the FAO fish culture expert, received considerable attention. Several questions concerning the food supply problem, introduction of domesticated fishes, construction of ponds, socio-economic conditions in the Caribbean area, etc., were raised and debated.

The Gulf and Caribbean Fisheries Institute has its headquarters at the Marine Laboratory, University of Miami, Coral Cables 34, Florida, U.S.A.

*S. Y. Lin*

# Fisheries Division Activities

Dr. H.H. Brown, O.B.E., has been appointed an assistant to Dr. Fiedler, the Fisheries Officer for ETAP. Dr. Brown received his M.A. from Cambridge University and his Ph. D. from Glasgow University. From 1931 to 1936 he did research in zoology and marine biology when assistant lecturer in Glasgow University. From 1936 to 1941, he directed a scientific and economic survey of the sponge industry in the Bahamas and British Honduras. From 1941 to 1946, he was Director of Fishery Investigations in the British West Indies and served as fisheries adviser both to the Caribbean Commission and to the Comptroller for Development and Welfare in the British West Indies. From 1943 to 1944, he served as joint-leader of a practical fishery explor atory survey in the waters of Trinidad, Tobago and British Guiana. From 1946 to 1948, he was Director of Fishery Research, British West Africa, and began a fishery research institute to cover the marine and fresh waters of Nigeria, the Gold Coast, Sierra Leone and Gambia. Since 1948, he has been Divisional Manager for Fisheries of the Colonial Development Corporation. Under his direction projects were started in the Seychelles, Nigeria, Gambia and the Falkland Islands.

Work continues on the various ETAP projects and progress made on those projects mentioned in *FAO Fisheries Bulletin*, Vol. 4, Nos. 4 and 5, may be summarized as follows.

*Chile.* Dr. Erik Poulsen has begun a biological survey to determine fisheries resources of Chilean waters. A campaign directed towards increasing the consumption of fish continues ; as part of this campaign,

a "fish week" was held in Valparaiso. As a pilot project to show what can be done, J. Fridthjof is planning a program to get fish to certain groups of miners.

*Ecuador.* Dr. Carlos Gonzales, an Argentinian fisheries technologist, has begun work on finding inexpensive methods of fish processing. Dr. Schweigger carried out experimental fishing with ground lines off the northern coast and is investigating various fishing methods. He plans to conduct oceanographic and biological work off the Galapagos Islands shortly.

*Haiti.* The Haitian Government has requested an extension of the ETAP project for another year, and an additional fish culture fellowship.

*Libya.* Dr. Serbetis has almost completed a survey of the sponge fisheries and has begun work investigating tuna resources.

*Pakistan.* A. van den Berg and H. van Pel completed their assignments in Pakistan and plans for the fishing harbor have been submitted to the Pakistani Government.

*Panama.* The Government has requested a detailed study on marine life, including its appraisal, classification, biology, fishing management laws, spawning, etc. with a view towards formulating ordinances for fishing in Panamanian waters on a scientific basis.

*Thailand.* S.W. Ling initiated training of local fisheries officers, studied the activities of the existing fisheries stations and submitted recommendations for their future activities, and appraised the suitability of certain waters for fish culture developments.

Work continues in organizing the training schools in Valparaiso, Chile, Singapore and Bangkok.

FAO has received various other requests for technical assistance, including the following:

*India.* The Government requests pilot fishing projects for Calcutta, Bombay and Madras as well as an appraisal of the Government's deep-sea fishing project in Bombay by a team of experts composed of a fish harbor engineer, a naval architect, a fish marketing expert and a fish culturist. As mentioned in *FAO Fisheries Bulletin No.* 4, Vol. 4, India had previously requested studies of inland and brackish waters in West Bengal, with a view to increasing the production of fish for local consumption.

*Iraq.* Technical assistance in the management of inland fisheries and the evaluation of a deepsea fishing project now underway in the Persian Gulf has been requested.

*Israel.* An agreement has been signed between Israel and FAO calling for a biologist to evaluate the fisheries research program and to assist in formulating and implementing such a program, a fisheries engineer to assist in developing methods for the capture of pelagic species, a biologist to assist in managing the fishery resources in the Sea of Galilee, and a fish culturist to assist in the diversification of the production of fish in ponds.

*Korea (South).* Experts in fisheries engineering, refrigeration and fish canning have been requested.

*Liberia.* An agreement has been signed for a fisheries engineer to assist in organizing a fleet of small fishing boats and a technologist to develop a fishery product suitable for inland distribution.

*Saudi Arabia.* Assistance has been requested to develop fisheries resources off the coast in the Red Sea.

*Somaliland.* A survey of pelagic fisheries resources of northern Italian Somaliland has been requested.

FAO needs experts in fisheries biology, statistics, engineering, and naval architects for temporary appointments to fill various requests for technical assistance. Any persons interested in such positions should contact the Fisheries Division of FAO.

# Notes on Films

THE FISHING GROUNDS OF THE WORLD. Producer : G.B. Instructional Ltd., Imperial Studios, Elstree Way, Boreham Wood, Herts, England. Distributor : G.B. Equipments Ltd., Mortimer House, Mortimer Street, London, W.1. For distribution outside the United Kingdom special arrangements are made in each case. Technical data : 16mm., black and white, sound, 428 feet, 12 minutes running time, commentary and titles in English or Swedish. Price in U.K. £ 17.10.0d. Rental in the United Kingdom : 7s. 6d. first day.

An animated map shows four of the main fishing grounds of the world. The north-west European fishing grounds are selected to demonstrate how fish are caught and utilized. Animated diagrams are used to show how the physical and biological conditions on the Continental Shelf, and the growth of plankton through the action of light rays, etc., give favorable conditions of fish development. A trawler is seen leaving Hull for Bear Island, an animated diagram shows the length of the trip, and brief shots show mending of the net on the outbound journey and the shooting of the trawl. Another animated diagram shows the principle of trawl fishing, followed by glimpses of the hauling of the trawl. Some very interesting sequences show the work aboard a trawler in very rough sea, the gutting and packing of the fish aboard and later unloading in Hull. Maps explain the delivery routes for fish in the United Kingdom.

The film is mainly intended for school use but does, as indicated, contain several sequences of interest for fisheries personnel.

*M. J.*

FISH SUPPLY OF THE WORLD. Producer: G.B. Instructional Ltd., Imperial Studios, Elstree Way, Borcham Wood, Herts, England. Distributor : G. B. Equipments Ltd., Mortimer House, Mortimer Street, London, W. 1. For distribution outside the United Kingdom special arrangements are made in each case. Technical data : 16 mm., black

and white, silent, 394 feet, 11 minutes running time, titles in English. Price in U.K.: black and white, £ 11.0.0 d. Rental in the United Kingdom : 5s. 6d. first day.

Contains almost the same material as the above-mentioned film, "The Fishing Grounds of the World," but has a more elementary treatment intended for younger children.

*M. J.*

THE SALMON INDUSTRY OF BRITISH COLOMBIA. Producer : G.B. Instructional Ltd., Imperial Studios, Elstree Way, Boreham Wood, Herts, England. Distributor : G.B. Equipments Ltd., Mortimer House, Mortimer Street, London, W.1. For distribution outside the United Kingdom special arrangements are made in each case. Technical data : 16mm., black and white, sound, 244 feet, 7 minutes running time, commentary and titles in English or Swedish. Price : 16mm. black and white, sound £ 10. 10. 0d., silent £ 8. 5. 0d. Rental in the United Kingdom : 7s. 6d. first day.

Four of the main fishing grounds of the world are indicated on an animated map. The Province of British Colombia, Canada, is selected as a region with a very important fishing industry. A short description of the life history of the salmon is given, as well as a sequence on the return of the young salmon to the sea. The film shows and explains fishing boats going out to sea, the setting of the seine net, how fish are unloaded at the cannery and transferred on to conveyers to the heading and gutting tables, an "Iron Chink," or automatic eviscerating and gutting machine, the inspection of the cleaned fish, its cutting up into pieces, and canning. The heat processing of the product in steam retorts is briefly explained.

Although mainly intended for school use, the film gives some good details of salmon fishing and of canning with traditional equipment.

*M. J.*

FISKERI OG HVALFANGST VED FAERØERNE (Fishing and Whaling off the Faroe Islands). Producer: Dansk Kulturfilm, Krystalgade 15 B, Copenhagen K, Denmark. Distributor : Statens Filmcentral, Dahlerupsgade 1, Copenhagen V, Denmark, and the Press Office of the Danish Foreign Office. Technical data : 16 mm., color, silent, 130 meters, 12 minutes running time, titles in Danish. Price : 16 mm. color print, 400 D.Kr.; 16 mm. black and white print, D.Kr. 200.

The film, produced in consultation with Heine S. Heinesen, shows fishing activities around the Faroe Islands, a fishing boat leaving the port, the baiting of long lines and their setting and hauling.

The greater part of the film is devoted to whale catching, and a whale catcher is shown approaching a group of fin whales. The cannon is made ready. The shooting and the hit are seen from different angles also the manner in which the whale is killed by a final shot and air pumped into it to keep it floating before it is hauled to the whaling station where the skin and blubber are removed.

Although somewhat disconnected, the film contains some instructive shots, especially on the whale catching operation.

*M. J.*

# Notes on Publications

FWS 1.0141 FISHERIES STATISTICS — NORWAY UDC 31:639.2(481)

Norway, Fiskeridirektøren. *Beretning om selfangsten, håkjerringfisket og overvintringsekspedisjonene. i 1950* (Report on Seal Catching, Greenland Shark Catch and Wintering Expeditions in 1950). Årsberetning vedkommende Norges Fiskerier, 1950, No. 9. Cammermeyers Boghandel, Oslo, Norway. 16 pp., 8 tables. In Norwegian. No price given.

1951

A textual and tabular account of manpower and craft used in Norwegian activities in the Arctic and their results in quantity and value. Similar reports for the five preceding years and for the interrupted 1940 season, in the same series and numbered 1945, No. 4; 1946, No. 4; 1947, No. 4; 1948, No. 6, and 1949, No. 10, were also issued in 1951.

G.M.G.

FWS 1.0141 FISHERIES STATISTICS — NORWAY UDC 31:630.2(481)

Norway, Fiskeridirektøren. *Norges Fiskerier* 1948. (Norwegian Fisheries, 1948). Norges Offisielle Statistikk, XI, 58. H. Aschehoug & Co., Oslo, Norway. 165 pp., tables. In Norwegian, with preface and list of contents also in French. N. Kr. 3.50.

1951

Contains the official annual fisheries statistics presented in previous issues (*see FAO Fisheries Bulletin*, Vol. 3, No. 4, p. 90). In addition, the introduction contains an account of the development of Norwegian fisheries statistics over the last 120 years.

G.M.G

FWS 1.0141 FISHERIES STATISTICS — NORWAY UDC 31:639.2(481)

Norway, Statistisk Sentralbyra. *Fiskeritelling 1. oktober* 1948. (Fisheries Census 1948). Vol. 1. Norges Offisielle Statistikk, XI, 62. H. Aschehoug & Co., Oslo, Norway. xxii + 251 pp. In Norwegian, with list of contents in French. N.Kr. 4.00.

1951

Contains mainly the statistical tables resulting from the census on the number of fishermen, their participation in fishing and its duration and in other activities, the fishermen's agricultural holdings, their fishing gear and shore facilities, and number of dependents, living conditions, etc. A short text describes the census work. Questionnaires and instructions used are reproduced in full. A short summary of the results, based on progress reports, is given in *FAO Fisheries Bulletin*, Vol. 4, No. 3.

G.M.G.

FWS 9.2 FISHERIES STATISTICS — COD, HAKE, ETC. UDC 31:639.2(485)

Molander, A.R. *Swedish Haddock Fishery during Three Decades.* Series Biology, Report No. 1. Institute of Marine Research, Lysekil, Sweden. 39 pp., 14 fig., 1 map, tables. In English, with Swedish summary. No price given.

1950

This is a compilation of statistical data on the Swedish haddock fishery from 1920 to 1948 inclusive, based mainly on haddock landing statistics at Göteborg. The following points of interest are discussed: fishery yield, 1920-1948 and landings in port of Göteborg fishery in the Skagerrack and Cattegatt, size distribution in catches, monthly distribution in a year, distribution of catches on the different fisheries (1920-1947).

H.R.,Jr.

FWS 1.011 FISHERIES STATISTICS – U.S.A. UDC 31:639.2(73:798)

United States Department of the Interior, Fish and Wildlife Service.
1951 *Canned Fish and By-products* 1950. C.F.S. No. 671. Washington 25, D.C., U.S.A. 19 pp. In English. Free.

The most recent issue of an annual series startes in 1921, gives statistics on canned fisheries products and oil, meal and similar by-products in the United States and Alaska, includes quantity and value of each canned commodity by can size, trade classifications and regions. The quantity and value of oil and meal production are given by species of origin and regions. Retrospective summary of production and imports is also given.

G.M.G.

FWS 9.2 FISHERIES STATISTICS - U.S.A. UDC 31:639.2(73:798:969)

Anderson, A.W. and Power, E.A. *Fishery Statistics of the United States,*
1951 1948. Statistical Digest No. 22. Unites States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 305 pp. In English. U. S. $ 1.25.

Contains statistics for 1948, collected during 1949, on quantity and value of fish catches, employment, quantity of gear operated, number of craft and certain information on the volume and value of manufactured fisheries products and by-products. (*See* also *FAO Fisheries Bulletin,* Vol. 4, No. 3, p. 42).

G.M.G.

FWS 1.013 FISHERIES STATISTICS — ARGENTINA UDC 31:639.2(82)

Argentina, Ministerio de Agricultura y Ganadería, Dirección General de
1950 Pesca y Conservación de la Fauna. *Producción Pesquera de la República Argentina, Años* 1943-44-45 (Fisheries Production of the Argentine Republic, Years 1943-44-45). Publicación Miscelánea No. 333. Buenos Aires, Argentina. 328 pp. In Spanish. No price given.

Detailed statistics of the sea and fresh-water fisheries' activities, including aquatic mammals and other aquatic animal products. Annual and/or monthly tables containing values and/or quantities of catches, landings, marine and inland fishing grounds, and trade are presented with breakdowns by import species or commodity groups. Further statistics cover aquatic mammal catches, craft, secondary industries, marketing in Buenos Aires, etc.

J.A.

FWS 9.2 FISHERIES CO-OPERATIVES — NORWAY UDC 33:639.2(481)

Norway, Fiskeridirektøren. *Samvirkekonsulentenes virksomhet* 1949-50 (Work
1951 of Consultants on Co-operatives, 1949-50). Årsberetning vedkommende Norges Fiskerier, 1950, No. 11. Cammermeyers Boghandel, Oslo, Norway. 35 pp., 3 tables. In Norwegian. No price given.

Contains official reports from two of the three advisors on co-operatives employed by the Government with a detailed account of their extension services in the fisheries field.

G.M.G.

FWS 9.7 FISHERIES EDUCATION — NORWAY UDC 37:639.2(481)

Norway, Fiskeridirektøren. *Plan for Statens Fiskarfagskoler* (Prospectus
1951 for Government Fishermen's Schools). Fiskeridirektoratets Smaskrifter, 1951, No. 9. A.S. John Griegs Boktrykkeri, Bergen, Norway. 12 pp., illus. In Norwegian. Free.

A short account of the curriculum of three Norwegian schools for fishermen operated by the Government, each offering courses for master fishermen, engineers and cooks.

G.M.G.

FWS 9.11 OCEAN UDC 551.46

Germany, Institut für Meereskunde an der Universität, Kiel. *Kieler Meeres-*
1950 *forschungen* (Marine Investigations in Kiel), Vol. 7, No. 2. Kommissionsverlag Walter G. Mühlau, Kiel, Germany. 166 pp., illus. In German. No price given.

Reports on research work carried on at the Institute for Marine Research of the University of Kiel. Of the ten studies included, six deal with marine biology. Adolf Remane gives a description of freshwater animals (excluding Protozoa and Vertebrata) in the North Sea and in the Baltic. The endemic algae of the Baltic Sea, and the taxonomic properties of certain Hydrozoa, Nematoda and Bryozoa are discussed in other papers. Four reports deal with hydrography, e.g. "The Natural Regions of the North Sea and the Baltic on a Hydrographical Basis," by Günter Dietrich and "An Experimental Presentation of the Relative Density of Living Organisms in the Surface Layers of the Atlantic," by Hermann Friedrich.

W.H.S.

FWS 9.11 OCEAN UDC 551.46

United Kingdom National Institute of Oceanography. *Annual Report,*
1951 1949-50. University Press, Cambridge, England. iv + 48 pp., 2 pl., 3 appendices. 5s net.

Reports on the establishment of a British National Oceanographic Council and on the organization of the National Institute of Oceanography, administered by the Council. The object of the Institute is to advance the sciences of physical oceanograpgy and marine biology; among other oceanographic services, it took over the work of the *Discovery* investigations and its two research vessels, R.R.S. *Discovery II* and R.R.S. *William Scoresby.*

Also reports on the location, scientific and administrative staff, research ships, physical work, biological work, and finances of the Institute. Appendices give the National Oceanographic Council Royal Charter, list of *Discovery* Reports and a list of published papers of the Institute.

H.R.,Jr.

FWS 9.11 OCEAN — PACIFIC OCEAN UDC 551.46(265/266)

Cromwell, Townsend. *Mid-Pacific Oceanography, January through March,*
1951 1950. Special Scientific Report: Fisheries No. 54. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. ii + 9 pp., 1 pl., 17 fig., 48 tables. In English. Free.

The first of several reports planned to present the hydrographic data in tabular and graphic form with discussions of some of the results of an oceanographic project being carried out by the Pacific Oceanic Fishery Investigations to describe the physical and chemical environment of the central equatorial Pacific. A brief description of the boat operated, the *Hugh M. Smith,* is presented together with the equipment and procedures being used.

H.R.,Jr.

FWS 9.11 SEA WATER — NORTH ATLANTIC OCEAN UDC 551.464(261)

Riley, G.A. *Oxygen, Phosphate and Nitrate in the Atlantic Ocean.* Bulletin
1951 of the Bingham Oceanographic Collection, Vol. 13, Art. 1. Peabody Museum of Natural History, Yale University, New Haven, Connecticut, U.S.A. 126 pp., 33 fig., appendix. In English. U.S. $1.90.

A preliminary qualitative discussion of the distribution of oxygen, phosphate and nitrate in the Atlantic Ocean, followed by a quantitative analysis of the inter-action between physical and biological agencies for the understanding of the distribution of these non-conservative properties.

H.R.,Jr.

FWS 9.1 FRESH WATER BIOLOGY — DICTIONARIES UDC 551.48(03)

Huet, Marcel. *Petit glossaire limnologique* (Short Limnological Glossary). 1949 Series D, No. 8. Station de recherches de Groenendaal, Liège, Belgium. 39 pp., illus. In French. No price given.

This review, originally published in the *Bulletin de centre belge d'étude et de documentations des eaux*, consists of a list of French limnological and hydrological expressions for which the correct definitions are given following an extended study of the authorities. In the second part the synonyma of more than 400 limnological expressions, many of which the proper signification is still undefined, are given in French, English and German. Adapted not only for professional limnologists, but also for fish culturists and people generally interested in hydro-biological research work, this glossary is a valuable means to facilitate understanding of professional publications.

W.H.S.

FWS 9 HYDROLOGY – AUSTRALIA UDC 551.48(94)

Rochford D.J. *Studies in Australian Estuarine Hydrology.* I. *Introductory and Comparative Features.* 1951 Australian Journal of Marine and Fresh Water Research, Vol. 2, No. 1. Commonwealth Scientific and Industrial Research Organization, Melbourne, Victoria, Australia. 116 pp., 70 fig., 1 pl., 10 appendices. In English.

The first in a series of comparative studies on Australian estuarine hydrology on the problems of the productivity of estuarine waters. It presents the chief features of Australian estuarine systems and the methods of analysis and terminology employed.

H.R.,Jr.

FWS 1.014 MARINE FAUNA UDC 59(45)

Bertuccioli, Umberto *Dizionario Nomenclatore dei Pesci Molluschi e Crostacei dei Mari Italiani più Frequenti sui Nostri Mercati.* (Classified Dictionary of the Fish, Mollusks and Crustaceans of the Italian Seas Most Common in our Markets). 1951 Osservatorio di Pesca Marittima, Venice, Italy. 135 pp. In Italian. No price given.

Designed to give, by quick consultation, the scientific and the Italian common names as well as those in dialect of any fish, mollusk or crustacean frequently found in Italian fish markets. Arranged in alphabetic order with the most important common name for each species in capital letters. This is a preliminary edition of the manual and the author expects criticisms and corrections for inclusion in the final edition.

H.R.,Jr.

FWS 9.12 FISHES UDC 597

Saunders, Harold E. *Some Interesting Aspects of Fish Propulsion.* Paper 1951 presented to the Chesapeake Section of the Society of Naval Architects and Marine Engineers. U.S.A. 37 pp., 8 fig. In English. No price given.

Non-technical paper giving comments on the maneuvrability and propulsion of fish and other aquatic animals, an analysis of the fish propulsion problem, and a list of selected reading matter on the subject.

H.R.,Jr.

FWS 1.015 FISHES — BIBLIOGRAPHY UDC 597(01)

*Bibliography of the Publications of Sunder Lal Hora.* Modern Art Press, 1951 Calcutta, India. 47 pp., illus. In English. No price given.

Lists in chronological order the 337 publications of Dr. Hora, the Indian ichthyologist, fishery biologist and zoo-geographer, published during

his twenty-five years of work as Director of the Zoological Survey of India and Director of Fisheries of Bengal. A description is given of his research activities and his bionomic, ecological, physiological, morphological, faunistic, and piscicultural studies are specified in analytical and subject indices.

W.H.S.

FWS 1.015 FISHES — THAILAND UDC 597(593)

Suvatti, Chote. *Fauna of Thailand.* Department of Fisheries, Bangkok, 1950 Thailand. iv + 1,100 pp., 1 fig. In English and Thai. No price given.

A check list of the fauna of Thailand compiled, to a large extent, from papers previously published by various authors. Contains a systematic classification, bibliography, including a chronological arrangement, classification by phylum, a list of authors, and an alphabetical index in English and Thai. The fish fauna are covered in a section of 266 pages. The list was prepared by the Department of Fisheries.

H.R.,Jr.

FWS 1.012 FISHES — MEXICO UDC 597(72)

Buen, Fernando de. *Nombres Científicos y Vulgares de Peces Mexicanos de* 1951 *Aguas Continentales* (Scientific and Common Names of Mexican Fishes of Continental Waters). Informe No. 9. Servicio Oceanográfico y de Pesca, Ministerio de Industrias y Trabajo, Montevideo, Uruguay. 5 pp. Mimeographed. In Spanish. No price given.

A list of the scientific and common names of commercially important fresh-water fishes of Mexico. Made available to co-operate with FAO in the preparation of a world nomenclature of scientific and common names of commercially important fish, crustaceans, mollusks and other aquatic organisms.

H.R.,Jr.

FWS 1.0114 FISHES — U.S.A UDC 597(73)

Clothier, C.R. *A Key to Some Southern California Fishes Based on Verte-* 1950 *bral Characters.* Fish Bulletin No. 79. California Department of Natural Resources, Division of Fish and Game, Sacramento, California, U.S.A. 83 pp., 23 pl., 22 fig. In English. No price given.

A study of the vertebral characteristics of 163 species of adult marine fishes, excluding Elasmobranchii, found between Point Conception and San Diego, California. A key based on the vertebral characteristics is given for the identification of the species studied. This is the first part of a study which will eventually cover the adult marine fishes found off the coasts of Mexico, California, Oregon and Washington.

H.R.,Jr.

FWS 1.013 FISHES — URUGUAY UDC 597(899)

Buen, Fernando de. *Nombres Científicos y Vulgares de los Peces Uruguayos* 1951 (Scientific and Common Names of Uruguayan Fishes). Informe No. 8. Servicio Oceanográfico y de Pesca, Ministerio de Industrias y Trabajo, Montevideo, Uruguay. 10 pp. Mimeographed. In Spanish. No price given.

A list of the scientific and common names of commercially important fresh-water and marine fishes of Uruguay. It is to be completed eventually by a list of mollusks, crustaceans and other aquatic organisms.

H.R.,Jr.

FWS 1.3 SALMONS, ETC. UDC 597.5

International Pacific Salmon Fisheries Commission. *Annual Report* 1950.
1950 New Westminster, Canada. 42 pp., 8 tables, illus. In English. No price given.

Presents statistics on Canadian and U.S. landings, 1942-1950, of sockeye salmon on the high seas and in the Pacific river systems. Special tables show the Indian catches and the estimated escapements of salmon to the spawning areas through fish-ways and natural obstructions. Description is given of the general hydro-biological investigations and experiments in 1950 for the rehabilitation of the barren areas.

W.H.S.

FWS 1.2 HERRINGS, ETC. UDC 597.5

Andreu, B. *Consideraciones sobre el Comportamiento del Ovario de Sardina (Sardina pilchardus* Walb.) *en relación con el Proceso de Maduración y de Freza.* (Considerations on the ovary of the sardine *Sardina pilchardus* Walb. in relation to the maturity and spawning process). Boletín No. 41. Instituto Espanol de Oceanografía, Ministero de Marina, Madrid, Spain. 16 pp., illus. In Spanish, with English summary. No price given.

The author presents a series of observations made on the ovaries of pilchards with the purpose of a better understanding of the number of seasonal spawnings of the species.

H.R.,Jr.

FWS 1.2 HERRINGS, ETC. — NORTH SEA UDC 597.5(261.2)

Gilis, Ch. *Voortgezette observaties over de visserij en de biologie van de jaarlijkse haring-concentraties door de belgische haringtreilers in de Noordzee uitgebaat* (Continued observations on the fishery and the biology of the annual herring concentrations caught by Belgian trawlers in the North Sea). Zeewetenschappelijk Instituut, Ostend, Belgium. 40 pp., 13 tables. In Flemish, with French summary. No price given.

A report on the Belgian herring fishery in the North Sea during the summer season 1950 and the winter season 1950/51. Includes detailed statistical information on the composition of the fleet, the number of trips and the total weight and value of the catches. Special chapters give a recapitulation of ichthyometric and maturity investigations on fat herring, caught during August, September and October and lean or winter herring, caught from December to March. The report closed with a speculative outlook on the 1951/52 herring season.

W.H.S.

FWS 1.1 TUNAS, MACKERELS, ETC. — PHILIPPINE REPUBLIC UDC 597.5(914)

Wade, C.B. *Larvae of Tuna and Tuna-like Fishes from Philippine Waters.*
1951 Fishery Bulletin, Vol. 51, No. 57. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 41 pp., illus. In English. Price U.S.$.0.25.

The results of the investigation carried on by the Philippine Fishery Program of the U.S. Fish and Wildlife Service on larval forms of tuna-like fishes, collected in Philippine and adjacent seas, are presented. Larvae formerly unknown of the following fish in the western Pacific are described and illustrated: *Grammatorcynus bicarinatus, Neothunnus macropterus, Katsuwonus pelamis, Euthynnus yaito,* and *Auxis* sp.

H.R.,Jr.

FWS 0.6 REFRIGERATION AND REFRIGERATION MACHINES UDC 621.57

The American Society of Refrigerating Engineers. *The Refrigerating Data* 1951 *Book. Applications Volume*, 3rd ed. 40 West 40th St., New York. 894 + ccxxxiv pp., illus., bibl. In English. U.S.$ 6.00.

The third edition of one of the most used reference books on the application of refrigeration is specially concerned with refrigeration in the food industries. Has chapters on fish refrigeration, bacteriology of frozen food, arrangement of frozen food in storage, etc. A complete section is devoted to cold storage plants. Other chapters deal with refrigerated transport of food, display cases for food in retail storage, etc., and manufacture of ice and dry ice. Contains a 225 page list of suppliers of refrigeration equipment in the United States.

M.J.

FWS 1 FISHERIES — BIBLIOGRAPHY UDC 639.2(01)

Pacific Science Council. *Papers Published in the Proceedings of the Seven* n.d. *Congresses of the Pacific Science Association*, 1920-1949. *Marine Biology, Fisheries, Fisheries Technology.* Pacific Science Council Secretariat, Bishop Museum, Honolulu, Hawaii. 19 pp. Mimeographed. In English. No price given.

A bibliography of the 317 papers on fisheries and marine biology presented during the seven congresses of the Pacific Science Association.

H.R.,Jr.

FWS 1 FISHERIES — BIBLIOGRAPHY UDC 639.2(01)

United States Department of the Interior, Fish and Wildlife Service. 1951 *Available Publications on Fisheries.* Fishery Leaflet 9. Washington 25, D.C., U.S.A., March 1951. 24 pp. In English. Free.

A revised list of publications issued by the Bureau of Fisheries both before and after its transfer from the Department of Commerce to the Department of the Interior, and contributions on fisheries subjects by the Fish and Wildlife Service, covering all aspects of the fisheries industry.

A.M.S.J.

FWS 1.015 FISHERIES — PERIODICALS UDC 639.2(05)

*Hind Fisherman*, Vol. 1, No. 1. Edited and published by G.K. Nambiar, 1951 36.B/1, Mount Road, Madras, India, October 1951. 24 pp., illus. In English. 9s. per annum.

A new monthly periodical devoted to progress and development of the fishing industry and the fish trade of India. The journal will endeavor to give a realistic description of the extent and importance of the Indian fishing industry and will try to promote a better mutual understanding among fishermen, sellers, buyers and government officers. The first number covers problems of the local fishing industry and gives answers to various questions which Indian buyers may ask about fish.

W.H.S.

FWS 9.1 FISHERIES — PERIODICALS UDC 639.2(05)

Tohoku University, Faculty of Agriculture. *The Tohoku Journal of Agri-* 1950 *cultural Research*, Vol. 1, No. 1. Sendai, Japan, March 1950. 149 pp., illus. In English. No price given.

Among other subïects the first issue of this journal presents a section on fisheries encompassing five studies on fish, oysters and seaweeds.

H.R.,Jr.

FWS 1.0117 FISHERIES UDC 639.2(263)

Idyll, C.P. (Editor). *Proceedings of the Gulf and Caribbean Fisheries Institute.* Marine Laboratory, University of Miami, Coral Gables, Florida, U.S.A. 152 pp., illus., 2 appendices. In English. No price given.
1950

Papers presented at the six technical sessions of the third annual meeting of the Institute in November, 1950, at Miami Beach, Florida. The sessions were commercial fisheries, inshore and shell fisheries, economics, fisheries administrators, fisheries exploration and technology, Caribbean and general. Also includes the addresses delivered and a summary of the technical sessions.

H.R.,Jr.

FWS 1.0146 FISHERIES — UNITED KINGDOM UDC 639.2(410)

Hardy, A.C. (Editor). *Survey of the Fishing Industry.* The Continental Daily Mail, 36 rue du Sentier, Paris (2), France, 21 April 1951. 12 pp., illus. In English. No price given.
1951

The fourth special fishing supplement of the Continental Daily Mail, again emphasizing the idea that "World Fishing is World Feeding," and that the products of the sea would be better available for man's consumption. It illustrates the efforts being made toward the expansion of world fisheries through articles on new developments on fisheries and fisheries research. Underlines also the potential importance of the fish factory ship from a point of view of British shipbuilding, marine engineering and auxiliary professions.

H.R.,Jr.

FWS 1.0147 FISHERIES —GERMANY UDC 639.2(43)

Meyer, P.F. (Editor). *Almanach für die Deutsche See-und Küstenfischerei.* 1951 (Almanach for the German Sea and Coastal Fisheries, 1951). Hans A. Keune-Verlag, Pressehaus, Hamburg 1, Germany. 460 pp. In German. No price given.
1951

Contains condensed statistical information on the German fishing industry, especially the main fishing ports of Hamburg-Altona, Bremerhaven, Cuxhaven and Kiel. Also contains regulations to prevent accidents on fishing vessels, procedures after collisions, rules of the road; technical information on fish culture; railway freight tariffs for fish shipments; price formation in the fishing industry; nets and net preservation, with lists of manufacturers; oceanography and navigation; directory of fisheries administrations, industrial and trade association, etc.; classified list of all fishing vessels in the Federation of W. Germany; conversion figures for measurements and weight units in European fishing countries.

E.H.

FWS 1.015 FISHERIES — INDIA UDC 639.2(54)

Chopra, B.N. (Editor). *Handbook of Indian Fisheries.* Ministry of Agriculture, New Delhi, India. 129 pp., 13 pl., 18 fig., tables. In English. No price given. Limited distribution.
1951

A reference book, prepared for the third meeting of the Indo-Pacific Fisheries Council, Madras 1951, which gives information on the different aspects of Indian fisheries. Organized in five parts as follows: general; fisheries; research; capture, utilization and distribution; socio-economics. Gives a list of important papers on Indian fisheries at the end.

H.R.,Jr.

FWS 1 FISHERIES INDUSTRIES — UNION OF SOUTH AFRICA UDC 639.2(68.01)

Howell, N. (Editor) *South African Fishing Industry Handbook and Buyer's Guide.* S.A. Trade Newspapers (Pty.) Ltd., P.O. Box 2598, Cape Town, Union of South Africa, June 1951. 240 pp., illus., tables. In English. No price given.

An indexed handbook containing information on the marine resources (pilchard, fish meal and oil, trawling, rock lobster industries); directories of fisheries organizations (Government Fisheries Division, Fisheries Development Corporation, Research Institute, Food Canners' Council), fishing companies, who's who in the fishing industry; classified lists of fish products and producers, suppliers; list of principal fishing vessels; marine engines.

E.H.

FWS 1.016 FISHERIES — NORTHERN RHODESIA UDC 639.2(689)

Northern Rhodesia, Game and Tsetse Control Department. *Annual Report for the Year* 1950. Government Printer, Lusaka, Northern Rhodesia. 25 pp. In English. 1s. 0d.

Covers, in addition to material on game conservation, the various fisheries of Northen Rhodesia, with specific reference to the Bangweulu Mweru-Luapula, Mweru Marsh and Lake Tanganyika fisheries, together with general statements on fish farming experiments, conservation work, fish culture, etc.

L.P.D.G.

FWS 1.017 FISHERIES — MAURITIUS UDC 639.2(69)

Colony of Mauritius Fisheries Branch. *Annual Report for the Year* 1950. Government Printer, Port Louis, Mauritius, April 1951. 12 pp., 2 graphs. In English. $0.25.

Discusses the long term program for the protection and development of fisheries in the island waters including such activities as the systematic investigation of the clupeid fishes, exploratory and deep sea fishing, fish farming, and the systematic study of fish species. Statistics of the catch and a list of scientific and common names of the fishes of Mauritius are also given.

H.R.,Jr.

FWS 9.6 FISHERIES RESEARCH — CANADA UDC 639.2(71)

Manchester, Lorne. *Science in Fisheries.* Reprint issued by the Department of Fisheries, Ottawa, Ontario, Canada, from the Canadian Geographical Journal. 23 pp., illus. In English. No price given.

A richly illustrated account of the 50-year history and work of the Fisheries Research Board of Canada, giving descriptions of the main studies carried out at the four biological research stations: the Atlantic Biological Station at St. Andrews, New Brunswick, with sub-station at Ellerslie, Prince Edward Island; the Pacific Biological Station at Nanaimo, British Colombia; the Central Research Station at Winnipeg, Manitoba; and the Newfoundland Biological Station at St. John's, Newfoundland; and at the three technological research stations: Atlantic Fisheries Experimental Station at Halifax, Nova Scotia; the Pacific Fisheries Experimental Station at Vancouver, British Columbia; and the Gaspé Fisheries Experimental Station at Grand River, Quebec.

E.H.

FWS 1.0116 FISHERIES RESOURCES UDC 639.2(73)

Buller, R. J. *A Fishery Survey of Southern Coastal Waters.* Special
1951 Scientific Report : Fisheries, No. 58. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. ii + 21 pp., 4 fig., 2 appendices. In English. Free.

First of a series of reports on the work of the research vessel *Albatross III* ; deals with the possibilities of expanding local fisheries resources on the southern Atlantic coast of the United States mainly off North Carolina. Exploratory operations carried on with an otter trawl on the area outside the 20 fathom (37 m.) line are also reported. A list of the fishes and larger crustaceans caught during the survey is given in an appendix.

H. R. Jr.

FWS 1.0116 FISHERIES — U.S.A. UDC 639.2(73)

Taylor, Harden F. and Associates. *Survey of Marine Fisheries of North*
1951 *Carolina.* The University of North Carolina Press, Chapel Hill, U.S.A. 555 pp. In English. U.S.$10.

This comprehensive book was written to review the status of fisheries in North Carolina, U.S.A., the nature and volume of the resources and the potentialities of their development. It is divided into the following parts : I, Hydrography of North Carolina Marine Waters ; II, Biology and Natural History of the Economic Species, and III, Economics of the Fisheries of North Carolina. In part III, some conclusions are drawn on principles affecting fisheries in general.

G.M.G.

FWS 1.019 FISHERIES — INDONESIA UDC 639.2(91)

Fiedler R.H. *The Fisheries of Indonesia.* Fisheries Leaflet 396. United
1951 States Department of the Interior, Fish and Wildlife Service, Washington 25 D.C., U.S.A. 60 pp. In English. Free.

This economic study gives a comprehensive review of the various phases of the industry, its administration and fisheries program. There are a summary and recommendations for future action.

G.M.G.

FWS 1.017 FISHERIES RESOURCES — AUSTRALIA UDC 639.2(94)

Blackburn, M. and Rayner, G.W. *Pelagic Fishing Experiments in Austra-*
1951 *lian Waters.* Technical Paper No. 1. Division of Fisheries, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia. 8 pp. In English. No price given.

Briefly reports successful methods found by experiments made during 1947-49 on catching the commercially important species : jack-mackerel (*Trachurus novae-zelandiae*), pilchards (*Sardinops neopilchardus*), anchovies (*Engraulis australis*), sprats (*Clupea bassensis*), southern bluefin tuna (*Thunnus maccoyii*), striped tuna (*Katswonus pelamis*), in southern Australian waters.

H.R., Jr.

FWS 1 FISHERIES RESEARCH UDC 639.2.001.5

Fisheries Research Board of Canada. *Annual Report* 1950. Ottawa,
1951 Canada. 138 pp. In English and French. No price given.

Contains reports by the station directors on the work of the four biological stations, the Eastern Arctic Fisheries Investigation, the three

fisheries experimental stations maintained by the Fisheries Research Board and the work of the Canadian Joint Committee on oceanography. A complete list of publications and reports published in 1950 is appended, as well as a roster of the scientific staff of the Board (biologists, chemists, physicists, bacteriologists, engineers, hydrographers, oceanographers), numbering some 200 scientists, including 66 seasonally employed research assistants.

E.H.

FWS 1 FISHERIES RESEARCH UDC 639.2.001.5

Institut des pêches maritimes de Gydnia. *Bulletin No* 5 (Bulletin No. 5
1950 of the Institute of Marine Fisheries, Gdynia, Poland). 155 pp., illus., tables. In Polish, with English and Russian summaries. No price given.

Formerly the Bulletin of the Hel Marine Station and Bulletin of the Marine Laboratory of Gdynia. Contains 15 papers by different workers on fisheries biology and technology, hydrography and plankton studies. A list of 90 studies published by the Institute from 1932 to 1949 is also given.

H.R., Jr.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL — DENMARK UDC 639.2.001.5(489)

Blegvad, H. *Report of the Danish Biological Station to the Ministry of*
1950 *Fisheries.* Nos. 51 and 52. Charlottenlund Slot, Charlottenlund, Denmark. 48 pp.; 50 pp. In English. No price given.

Report No. 51 encompasses two papers by A. J. C. Jensen, one on "Changes in the Quality of the Herring in the Course of the Year and from Year to Year," and the other on the "Amount and Growth of Herring Fry in Danish Waters." Report No. 52 contains the following four papers: E. M. Poulsen, "The Sprat Fishery and the Sprat Populations in Danish Waters;" J. Knudsen, "Contributions to the Biology of the Whiting (*Gadus merlangus* L.) in Danish Waters"; and by R. Spärch, on "The Fluctuations in the Oyster Stock of North-western Europe," and "On the Distribution of the Slipper-limpet (*Crepidula fornicata*) in Danish Waters." Both Reports are illustrated with figures, maps and tables.

H.R., Jr.

FWS 9.16 FISH CULTURE — BIBLIOGRAPHY UDC 639.3(01)

Commission internationale des industries agricoles. *Bibliographie. Livres*
1951 *publiés en anglais sur la pisciculture. Période d'après-guerre.* (Bibliography. Books published in English on Fish culture. Postwar Period). Paris, France. 3 pp. Mimeographed. No price given.

A list of books and papers on fresh water fish, pondfish culture and different fisheries studies.

H.R., Jr.

FWS 9.16 FISH CULTURE — FEEDING AND NUTRITION UDC 639.3.043

Burrows, R.E., Robinson, L.A., and Palmer D.D. *Tests of Hatchery Foods*
1951 *for Blueback Salmon (Oncorhynchus nerka)* 1944-1948, 1949, 1950. Special Scientific Reports: Fisheries Nos. 59, 60, 63. United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. 39 pp.; 21 pp., 23 pp. In English.

The three reports give results of feeding trials of fingerlings of blueback salmon for the determination of the comparative value of various

proteins and nutritional adequacy of experimental rations carried on at the Leavenworth Laboratory of the Fish and Wildlife Service. M.H Payne, Jr. also contributed to the report for 1950.

H.R., Jr.

FWS 9.6 FISH CULTURE — PROPAGATION UDC 639.303

Matthews, J.P. and de Jager, B.V.D. *The Development of the Cape Codfish.*
1951 Investigational Report No. 13. Fisheries and Marine Biological Survey Division, Department of Commerce and Industries. The Government Printer, Pretoria, Union of South Africa. 10 pp., illus. In English. No price given.

Describes fertilization of the eggs of the Cape stockfish or hake (*Merluccius capensis*) carried out artificially on board a research ship and the development of eggs and larvae up to the two-and-a-half days' stage after hatching. All attempts to keep the larvae alive beyond that state were unsuccessful.

B.F.O.T.

FWS 9.16 FISHERIES MANAGEMENT — FRESH WATERS — JAPAN UDC 639.31(52)

Van Cleve, R. *Japanese Fresh-water Fisheries and Water Use Projects.*
1951 Preliminary Study No. 59. Natural Resources Section, General Headquarters, Supreme Commander for the Allied Powers, Tokyo, Japan. 29 pp., 2 fig. In English. Free.

The author reports his observations made during a brief survey of the fresh-water fish and fisheries in representative rivers and streams throughout Japan. Based on these observations and information acquired from different fisheries workers, he presents a series of recommendations for the better management and conservation of the fresh-water fisheries of Japan. Recommendations are made for the construction of fish ladders for a better handling of anadromous fish through the increasing number of dams, revision of the hatchery system, development of life history studies for the establishment of management programs, pollution control, and better laws and co-ordination for the use of the water systems.

H.R., Jr.

FWS 9.17 FISHERIES MANAGEMENT UDC 639.313

Erkkila, Leo F. ; Moffett, James W. ; Cope, Oliver B. ; Smith, Bernard R. ;
1950 and Nielson, Reed S. *Sacramento-San Joaquin Delta Fishery Resources : Effects of Tracy Pumping Plant and Delta Cross Channel.* Special Scientific Report : Fisheries No. 56 United States Department of the Interior, Fish and Wildlife Service, Washington 25, D.C., U.S.A. ii + 109 pp., 12 fig., appendix. In English. Free.

A summary and discussion of data collected in 1947-1949 during the program for the development of measures to protect and manage the fisheries resources in the Sacramento-San Joaquin Delta in view of the construction of the Delta Cross-Channel, the Tracy Pumping Plant and their pertinent works. The data used is observational and not yet fully analyzed.

H.R., Jr.

FWS 9.15 WATER POLLUTION UDC 639.331.5

Huet, Marcel. *La Pollution des eaux* (Water Polution Series D, No. 9,
1949 Station des recherches de Groenendaal, Liège, Belgium. 31 pp., illus. In French, with Dutch and German summaries. No price given.

An account of the effects of pollution of waters by soluble organic and inorganic substances and materials in suspension on the stocks of fish and a description of the biological analysis of polluted waters. Includes three tables with drawings of the principal organisms of the system of saprobies and gives information on the various methods in use for purifying polluted waters. In the last part of the report the judicial aspects of pollution and the ways of estimating the damage caused by incidental or continual pollution are discussed.

W.H.S.

FWS 2.6 FISH TRADE UDC 658.6/8

SCHIOTTZ, O.S. (Editor) and Benemann Bischoff, P. (Sub-Editor). *EIAS-*
1950 *Code*. 1st Edition. Exporters Information and Advert'sing Service, Kompagnistraede 16-18, Copenhagen, Denmark. 416 pp. In English, Danish, French and German. D.Kr. 75.

The first edition of an international telegraphic code for the fishing industry, covering the fresh, frozen, salted and smoked fish trade. Scientific and common names in different languages of fish, mollusks and crustaceans are listed with references to their position in the telegraphic code. The species listed are illustrated and their commercial value is also given. An index of fish names in fifteen languages with reference to the code is given, as well as a list of fish merchants in various countries with their telegraphic addresses and telephone numbers, and an advertisers' index.

H.R.,Jr.

FWS 3.3 CANNING — BIBLIOGRAPHY UDC 664.8.036.5(01)

Foskett, A.J. *Food Canning, a Select Bibliography*. Technical Commu-
1951 nication No. 8. Research Division, the Metal Box Co. Ltd., Kendal Avenue, Westfields Road, Acton, London, W.3. April, 1951. 28 pp. In English. Free.

Some 160 books, bulletins, circulars, etc. are listed under the group titles : Food Technology ; Canning ; General ; Fish ; Fruit and Vegetables ; Meat ; Milk ; Soup; Home Canning and Bottling; Nutritive Values and Regulations and Inspections.

E.H.

FWS 6.13 REDUCTION OF FISHERY PRODUCTS UDC 664.957.1. 665.213.03

Sildolje- og Sildemelindustriens Forskningsinstitutt. *Årsberetning* (An-
1951 nual Report of the Herring Oil and Meal Industry Research Institute) 1950-1951. J.W. Eides Boktrykkeri, Bergen, Norway. 20 pp. In Norwegian. No price given.

Follows the pattern of the 1949-1950 report referred to in *FAO Fisheries Bulletin*, Vol. 4, No. 3, p. 48. Also describes the new pilot reduction plant.

A.M.S.J

FWS 1.7 FISHERIES MANAGEMENT UDC 639.2.04

Wing, L. W. *Practice of Wildlife Conservation.* John Wiley & Sons,
1951 Inc., New York ; Chapman & Hall, Ltd., London. xii+ 412 pp. illus. In English. Price : U.S. $5.50.

This book offers a thorough coverage of the broad fields of wildlife conservation and management. Combining available information, it presents the biological and ecological techniques for sound management. Two chapters deal with lake fish, stream improvement and management, including fish culture. Sea mammals requiring protection, especially under international actions, are also discussed.

B.F.O.T.

FWS 2.11 FISHING BOATS — JAPAN UDC 639.2.06 (52)

Japan, Fisheries Agency. *Investigation on Operational Situations of Fishing*
1951 *Vessels and their Crews, as of the End of* 1949. Tokyo, Japan. Parts I and II. 44 pp., Part III 95 pp., April 1951. In English and Japanese.

This investigation, confined to the powered fishing vessels in tidal waters registered up to 31 December 1949, covers the period 1 January-31 December 1949. Its principal aim is to give a picture of the Japanese fishing fleet, its various operations, and inventory of crews. The statistical data compiled cover a wide range of subjects combining several aspects of the fishing fleet, such as operations by months, types of fisheries, size of vessels, suspension of activities, etc., is based on an inquiry card issued to fishing vessels through the local government.

J.A.

FWS 1.2 FISHING — HERRINGS, ETC. UDC 639.222

Hodgson, W. C. (Editor) *Fisheries of the North-east Atlantic—Herring*
1951 *Atlas* (*Fishing Grounds, Landing Ports and Quality*). International Council for the Exploration of the Sea, Charlottenlund, Denmark. In English, French and Danish.

A series of 12 monthly charts indicating the average distribution of the main herring concentrations in the north-eastern Atlantic area and the condition of the herrings in the various fisheries. A list of types of gear used in the principal fisheries of the north-east Atlantic countries and the trade categories of herrings in Britain and the Netherlands are given.

H.R.,Jr.

FWS 1.014 FISHERIES INDUSTRIES UDC 639.222.2 (410)
— HERRING, ETC. — UNITED KINGDOM

United Kingdom, Herring Industry Board. *Sixteenth Annual Report for*
1951 *the Year Ended* 31*st March* 1951. Cmd. 8322. H. M. Stationery Office, London. 36 pp. In English. Price 1s.3d. net.

After a statement on the constitution and powers of the Board, the report surveys fishing conditions during the different seasons. A section on marketing covers domestic demand and export markets for herring products. Research and development reports include projects on oil and meal reduction, mechanized curing, canning, quick freezing, experimental boats and fishing methods. Mention is made of grants and loans for the building and acquisition of boats, nets and gear. Gives statistics on various other features of the herring industry, the accounts and balance-sheet of the Herring Industry Board and the Herring Fishery Fund. An appendix presents an abstract from a memorandum (on the economic state of herring fishing), submitted by the Board to the Scottish Home Department, September 1950.

L.P.D.G.